

In re: Morio Taneda
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Amendments to the Abstract:

On new page 28 following the claims, please insert the following abstract:

NOISE REDUCTION AND AUDIO-VISUAL SPEECH ACTIVITY DETECTION

ABSTRACT

A noise reduction system including an audio-visual user interface combines visual features extracted from a digital video sequence with audio features extracted from an analog audio sequence. The digital video sequence may show the face of a speaker, and the analog audio sequence may include background noise in an environment of said speaker. Audio sequence detection means are used to detect said analog audio sequence, and audio feature extraction and analysis means are used to analyze said analog audio sequence and extract said audio features therefrom. Video sequence detection means are used to detect said video sequence, and visual feature extraction and analysis means are used to analyze the detected video sequence and extract said visual features therefrom. A noise reduction circuit is configured to separate the speaker's voice from said background noise based on a combination of derived speech characteristics and output a speech activity indication signal. The speech activity indication signal includes a combination of speech activity estimates supplied by said audio feature extraction and analysis means and said visual feature extraction and analysis means. A multi-channel acoustic echo cancellation unit is configured to perform a near-end speaker detection and double-talk detection algorithm based on the speech characteristics derived by said audio feature extraction and analysis means and said visual feature extraction and analysis means.